

## *Roanoke River Flow Report*

miles, only 15% are fully supporting, 19% are support-threatened, 47% are partially supporting, and 7% are not supporting. The remaining stream mileage was not evaluated. In 1993, there were 36 facilities with NPDES permits operating within the lower Roanoke River. Compliance is rated as very high, depending on year if weighted by flow. Compliance is somewhat lower if judged on a per effluent parameter limited basis. In order to properly determine the appropriate effluent limitations to be contained in permits for point sources of discharge to rivers, the capability to accept waste (assimilative capacity) must be determined. A revised (1990) water quality model has consistently predicted that the carbon biological oxygen demand (CBOD) capacity of the lower watershed is exhausted.

**WATER QUALITY MONITORING.** Ambient monitoring is conducted by the DEM at seven locations in the River from Roanoke Rapids Dam to the mouth of Batchelor Bay in Albemarle Sound. The most recent data summary shows consistently good water quality with the noteworthy exception of dissolved oxygen. In late spring, summer, and early fall the dissolved oxygen level drops below the swamp water standard of 4 mg/L for extended periods in the lower River. While some of these problems do occur during low flow periods, the problem is not just flow related. In fact, these low levels are predicted by the 1990 assimilative capacity calculations under a number of flow scenarios.

**HYDROLOGY OF LOWER RIVER.** A description of impoundments and reservoir operations including flood control, spawning flows, and minimum flow requirements are presented.

**TIME TRAVEL STUDIES.** Time of travel studies using dye were conducted from Roanoke Rapids to Plymouth. At Roanoke Rapids, velocity ranged from 0.8 mph at 1,000 cfs to 2.5 mph at 32,000 cfs. Under peaking (fluctuating flow) conditions, dye additions made during a low discharge could be overtaken by a later peaking discharge and the transit time shortened substantially. At flows of about 2,600 cfs, dye inserted at Oak City (River Mile 60) requires between 125 and 163 hours to reach Plymouth at River Mile 10. At about 5,600 cfs, the time of travel for dye is shortened to between 108 and 135 hours.

**OVERWINTERING SONGBIRDS.** Preliminary findings indicate that there is a consistent association between selected overwintering birds and large trees ( $\geq 20$  cm in diameter), and that selected plant species provide important foraging and resting substrate. These findings have important management implications for overwintering avifauna given current land and hydrological management practices on the Roanoke River. Forest and habitat management practices should be designed to maintain a patchwork of tree stands of different size classes, thereby ensuring the availability of large trees. Roanoke basin hydrological management schemes should take into consideration the potential long-term effects on plant population processes such as regeneration, recruitment, and tree mortality.

**AQUATIC MACROINVERTEBRATE ECOLOGY.** The key to long-term invertebrate management is to mimic natural (pre-impoundment) hydrology by creating a dynamic flow regime. Particular sites within the floodplain will vary in flood timing, rate, duration, and depth within a year among years. The vast Roanoke River floodplain under dynamic flooding will have prolonged foraging opportunities for waterbirds because the topographic/hydrologic interactions create hundreds of unique microwetlands.

**PUBLIC LANDS.** Efforts to protect large tracts of relatively intact forested wetlands of the Roanoke River floodplain have been underway since at least the late 1970s. Organizations and agencies involved in land acquisitions include the North Carolina Nature Conservancy, the North Carolina Wildlife Resources Commission, the North Carolina Natural Heritage Program, the North Carolina Wildlife Federation, the US Fish and Wildlife Service, Ducks Unlimited, the Sierra Club, the Bertie County Board of Commissioners, and the North Carolina Department of